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EPA Superfund
Record of Decision:

WOODBURY CHEMICAL CO. (PRINCETON PLANT)
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PRINCETON, FL
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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Woodbury Chemical Site
Princeton, Florida

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Woodbury Chemical Site in Princeton, Florida. The final site remedy was chosen in accordance with the Comprehensive Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 U.S.C. Section 9601 et. seq., and to the extent practicable, the National Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the administrative record file for this site.

The State of Florida concurs on the selected remedy.

DESCRIPTION OF THE REMEDY

This remedy is the final action for the site. In the absence of any significant source of contamination remaining in the soil at the site, the No Further Action alternative was selected as the preferred alternative to address the soil. Due to a lack of significant ground water contamination, the No Action alternative was chosen for ground water at the site. However, the ground water will be monitored quarterly for one year to verify that no site-related release of contaminants is occurring. If the results of the monitoring show that there is no unacceptable risk from exposure to site-related contaminants in the ground water, then the site will be considered for deletion from the National Priorities List (NPL). However, should monitoring indicate that the site poses a threat to human health or the environment, EPA, in consultation with the State of Florida, will reconsider the protectiveness of the "No Action" alternative and the feasibility of groundwater remediation will be reevaluated.

DECLARATION

Based on the results of the Remedial Investigation and Risk Assessment conducted at the Woodbury Chemical Site, EPA has determined that no further remedial action is necessary to ensure protection of human health and the environment. The removal action that took place at the site in January 1990 eliminated the need to conduct additional remedial action. The selected remedy is protective of human health and the environment. Because this remedy will not result in hazardous substances remaining on-site above health-based levels, the five-year review will not apply to this action. EPA has determined that no further remedial action is necessary at this site. Therefore, the site now qualifies for inclusion in the "sites awaiting deletion" subcategory of the Construction Completion category of the National Priorities List.

Record of Decision

Summary of Remedial Alternative Selection

Woodbury Chemical Site

Princeton, Florida

Prepared by:
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DECISION SUMMARY FOR THE RECORD OF DECISION
WOODBURY CHEMICAL SITE
PRINCETON, FLORIDA

1.0 SITE LOCATION & DESCRIPTION

The Woodbury Chemical Site is a currently operating facility which occupies five acres along the west side of U.S. Route 1 (Dixie Highway) in southeast Dade County, approximately one-half mile southwest of Princeton, Florida (Figure 1-1). The street address is 13690 S.W. 248th Street (Coconut Palm Drive).

Woodbury Chemical is situated on low, flat terrain surrounded primarily by agricultural land and is sparsely populated. Princeton, Florida has an estimated population of 20,000. The Homestead Air Force Base is located 2.5 miles to the south. The area east of the site contains subdivisions, trailer parks, businesses, and Homestead Air Force Base housing facilities.

Five miles east of the site is Biscayne Bay, and the Everglades are located approximately 15 miles to the west. An estimated 2350 feet northeast of the site is a state-owned and operated canal identified as Canal C-102, which flows east toward and connects with Biscayne Bay. Directly underlying the site is the Biscayne Aquifer, which supplies all potable water for Dade County and has been designated as a sole-source aquifer.

The site is bordered to the north by S.W. 248th Street and to the east by Route 1, with two retail businesses northeast of the site at the intersection of these two roads. One is Greenstein Trucking and the other is C.A. Chambers Properties, with a vacant building is situated between them. North of 248th Street is a tomato field with a horticulture nursery west of that. An abandoned railroad spur is located between the site and Route 1. To the west is a farm field owned by the Woodbury Chemical Company and west of that is an avocado grove. To the south of the site is Glade & Grove Supply, a tractor and farm equipment supply and repair business and FMC Agricultural Division Warehouse, a pre-packaged farm supplies distributer (Figure 1-2).

Five buildings utilized by the company are located on the property. In addition, a residence which is occupied by a company employee is situated at the north end of the site. Another residence just west of the site also houses a company employee. The office building was initially used as a warehouse in 1924 in the produce operation. The warehouse was formerly the tomato and potato packing and canning plant and is currently used for stocking bags of clay and other bulk solids. The formulation building houses the fertilizer formulation plant. Before it was built in 1977, this area was occupied by Woodbury's pesticide formulation operation. The shop is employed as a vehicle maintenance and repair area and previously served as the mixing building. It was one of the original buildings used by previous occupants in the canning business. The sales office, known as S&M Farm Supply, was built between 1975 and 1977 and houses
a retail store and warehouse for finished products.

The site is fenced and the majority of it is paved. Surface runoff at the site flows to a sump drain, located between the formulation building and the vehicle maintenance shop. It leads to an underground concrete holding tank with a 1200-gallon capacity, which is occasionally pumped out through a hose leading into the adjacent farm field (Figure 1-3). The northern area of the site contains several French drains which allow runoff to percolate directly into the ground.

2.0 SITE HISTORY

Since 1959, Woodbury Chemical has been actively engaged in the formulation of technical-grade

materials to produce pesticides and fertilizers. Operations were initiated in Goulds, Florida, three miles northeast of Princeton, and were relocated to Princeton in 1975. The current location had previously been used as a tomato and potato packing house and a labor camp for migrant farm workers.

Railroad access to the site was present until 1988 when the rails and cross ties were removed and the railroad bed was scraped level. The overburden from the railroad bed was used to fill the ditches that existed between the site and the tracks. While the railroad tracks were present, bulk product was delivered to the site via rail cars. These bulk products included potassium chloride, nitrogen, and methyl bromide.

During the late 1970's (exact time-frame uncertain) an above-ground tank leaked or spilled the pesticide toxaphene onto the ground just south of the formulation building (Figure 1-2). In January 1979, Dade County Environmental Resources Management (DERM) inspector Bob Donoghue filed a formal in-housecomplaint against S&M Farm Supply, Inc. charging them with causing excessive levels of nitrates in the drinking water wells located upgradient, downgradient, and within the site. A February 20, 1980 EPA Hazardous Waste Site Identification and Preliminary Assessment Report recommended the Woodbury Chemical site for a Site Inspection. Another Preliminary Assessment was prepared by the Florida Department of Environmental Regulation (FDER) in August 1984. EPA performed a site screening investigation in July 1985 and based on the results, tasked NUS to resample the site in January 1986. NUS submitted a preliminary Hazardous Ranking System (HRS) scoring summary to EPA in February 1986 and a submitted a final HRS package in January 1987. The Woodbury Chemical Site was proposed for the National Priorities List (NPL) in June 1988 and was placed on the final list in August 1990. A Potentially Responsible Party (PRP)
Search Report, completed in March 1990, indicated the only PRPs for the site to be those individuals and company names associated with the current operation at the site.

In January 1990, under the direction of EPA and DERM, Woodbury Chemical conducted a removal of toxaphene-contaminated soil in the area of the previously-mentioned spill. The removal was conducted in two phases. In Phase I, all soil containing toxaphene in concentrations greater than 100 parts per million (ppm) were excavated and shipped to the GSX facility in Pinewood, South Carolina. Phase II consisted of excavating soil containing toxaphene in concentrations less than 100 ppm and transporting it to the South Dade County Landfill. Confirmatory sampling ensured that the remaining soils, when subjected to the EPA Extraction Procedure (EP Tox) test, produced an extract that contained 0.005 mg/l or less toxaphene.

In March 1990, a Special Notice Letter was issued to the Woodbury Chemical Company to give the PRP the opportunity to conduct the Remedial Investigation and Feasibility Study (RI/FS) at the site. The PRP's response did not constitute a good-faith offer, and consequently, EPA decided to
perform the RI/FS as an in-house project. In January and June 1991, EPA Region IV Environmental Services Division (ESD) personnel collected soil, sediment, subsurface soil and ground water samples as part of Phases I and II of the RI.

3.0 COMMUNITY RELATIONS HISTORY

The Woodbury Chemical Site is located in Princeton, Florida in unincorporated Dade County. The area is primarily agricultural with several more densely populated small towns located nearby. Goulds, Florida is approximately 2 miles northeast of the site, Naranja, Florida is 2.5 miles southwest, and the Homestead Air Force Base is 2.5 miles to the south.

Community interviews were conducted by EPA in August 1990 to determine public interest in the Woodbury Chemical Site. The conclusion drawn from these interviews is that the local community

has little or no concern regarding the site. It appears that, since the area is heavily agricultural and the population is so familiar with pesticide use, the threat of pesticide contamination is not a serious concern. EPA held an Availability Session at the Homestead Public Library on September 27, 1990 to provide information and answer questions on the RI to be conducted at the Woodbury Chemical Site. The only attendee was the DERM project manager assigned to the site.

The RI, Risk Assessment, and Proposed Plan for the Woodbury Chemical Site were released to the public on March 31, 1992. These documents were made available in both the administrative record and an information repository maintained at the EPA Records Center in Region IV and at the South Dade Regional Library in Cutler Ridge, Florida. The notice of availability for these two documents was published in the Miami Herald on March 24, 1992. A public comment period was held from March 31, 1992 through April 30, 1992. In addition, a public meeting was held on April 7, 1992. At the public meeting, which was attended by only two people (the PRP and his attorney), representatives from EPA answered questions about the findings of the RI and Risk Assessment and EPA's Proposed Plan for the site. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision. This decision document presents the selected remedial action for the Woodbury Chemical Site, in Princeton, Florida, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. The decision for this site is based on the administrative record. These community relations activities fulfill the statutory requirements for public participation contained in CERCLA section 113(k)(2)(B)(i-v).

4.0 SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses the final response action for the Woodbury Chemical Site, addressing both soil and ground water. Because the baseline risk assessment indicates that the previous removal action eliminated the principal threat at the site, EPA proposes "No Further Action" for the soil at the site. Ground water analysis and results of the risk assessment suggest that "No Action with Monitoring" for the ground water will be protective of human health and the environment. The ground water will be monitored quarterly for one year to confirm that the few samples collected during the RI which contained contaminants above drinking water standards are not indicative of a release of contaminants from the Woodbury Chemical Site. If ground water monitoring indicates an unacceptable risk from contaminants used in Woodbury Chemical's operations, EPA will reconsider the protectiveness of the "No Action" alternative and the need for protective measures on groundwater reevaluation. Two areas that do not fall under the scope of this action are the elevated levels of nitrates that occur region-wide and arsenic, which is not site-related, found along the railroad right-of-way which runs adjacent to the site. The response actions are consistent with the NCP (40 CFR 300.68).

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 SITE DRAINAGE

The Woodbury Chemical Site and surrounding area has very little topographic relief. The site is paved with asphalt except for the western portion of the site, extending from a line running north-south just west of the sales office (Figure 5-1). The area west of this line is covered with a prepaving material consisting of crushed gravel and sand mixed with a sealer. The pre-paved area is used to store farm equipment and portable storage tanks. The northern portion of the site has been graded such that the paved area facilitates the diversion of rainwater toward several French drains. The southern portion of the site surrounding the fertilizer plant and formulation building drain toward a large concrete sump, located between the two buildings. The sump is used to collect spillage resulting from the loading of trucks and tanks in the fertilizer and formulation area. The contents of the sump, which has a 1,200 gallon capacity)

are then pumped onto the farm field to the west of the site. All permanent bulk storage tanks, including fuel tanks, are located in diked areas.

5.2 SURFACE WATER FEATURES

Five miles east of the site is Biscayne Bay, and the Everglades is located approximately 15 miles to the west. An estimated 2350 feet northeast of the site is a state-owned and operated canal identified as Canal C-102, which flows east toward and connects with Biscayne Bay (Figure 5-2). It is very unlikely that surface water runoff from the site would reach this canal, since the roadways surrounding the site are at higher elevations than the site itself. Furthermore, there are no man-made conveyances to provide for movement of water from one side of the road to the other.

5.3 GEOLOGY AND HYDROGEOLOGY

Directly underlying the site is the Biscayne Aquifer, which supplies all potable water for Dade County and has been designated as a sole-source aquifer. Geologically, the Biscayne Aquifer is composed of soils of Holocene age and limestone, sandstone, and sand ranging in age from Pleistocene through late Miocene. In the site vicinity, it is primarily limestone and extends to a depth of approximately 80 feet below sea level. Solution cavities occupy a significant volume of the limestone in the Biscayne Aquifer, causing it to have high horizontal and vertical permeabilities. The lower part of the oolitic limestone is also cavity riddled and is identified by the presence of bryozoans. A hard cavernous limestone underlies the bryozoan layer. Because of the extremely high permeability of this limestone, all large capacity wells are completed in this part of the aquifer, generally 40 to 100 feet below land surface. Transmissivity of the Biscayne Aquifer ranges from 5.4 X 10[4] ft[2]/day where the aquifer is mostly sand to greater than 1.6 X 10[6] ft[2]/day in the limestone-rich areas. Regional flow of ground water is to the southeast; however, the direction of flow may be influenced by drainage canals or well fields. Flow direction in the site area appears to be influenced by the C-102 Canal, as it ranges in direction from east to northeast.

5.4 RESULTS OF THE REMEDIAL INVESTIGATION

The purpose of the Remedial Investigation (RI) was to gather and analyze sufficient data to characterize the site in order to perform the Baseline Risk Assessment, which determined the site's impact on human health and the environment. Both the RI and Risk Assessment are used to determine whether remedial action is necessary at the site.

The RI sampling at the Woodbury Chemical site was conducted in two phases. Phase I was conducted in January 1991 and included the collection of fifteen surface soil, fourteen subsurface soil, and eighteen ground water samples. These samples were analyzed for volatile and extractable organics, pesticides, PCBs, metals, cyanide, and nitrate/nitrite as nitrogen. In addition, selected surface and subsurface soils were analyzed for total organic carbon (TOC).

Phase II was conducted in June 1991 as a result of the findings of Phase I. During Phase II, some of the sample locations from Phase I were resampled to verify the findings. Other sample locations were added to determine the lateral extent of contamination found during Phase I. Eight surface soil samples were collected from the farm field to the west and analyzed for pesticides to find the horizontal extent of contamination detected on the western portion of the site. Three surface soil samples were collected east of the railroad right-of-way and analyzed for metals to determine the extent of arsenic contamination. Three monitoring well locations were resampled, and three new ones were installed along the railroad right-of-way. Six private wells were sampled, most of them east of U.S. Route 1 to determine if arsenic detected in the ground water along the railroad was migrating to the east. All ground water samples were

analyzed for pesticides, metals, and nitrates.

Sampling locations and results from both phases of the RI can be found in Appendix A. Pesticides were detected in the surface soil mainly in the northern and western portions of the site as well as in the adjacent farm field. Pesticides in subsurface soils were localized in the southwestern
corner of the site. In ground water, pesticides were detected mainly offsite to the south and east.

Arsenic was detected offsite only in the surface and subsurface soil and ground water along the abandoned railroad right-of-way east of the site, including areas that are not adjacent to the site.

Chromium was detected in soil onsite and in soil and ground water along the railroad right-of-way. It was found in the background sample as well. The source of this chromium is unknown.

Nitrates were detected in every ground water sample collected during both phases of the RI, including background. A few samples, including two located on site, contained nitrates above the drinking water standard.

A topographic survey of the Woodbury Chemical site was conducted by the U.S. Army Corps of Engineers. The resulting topographic map with a one foot contour interval indicated that the site is very flat with drainage in the southern portion of the site (formulation and truck loading area) flowing toward an onsite sump. The northern part of the site is drained by French drains. The roads surrounding the site are at higher elevations than the site and serve as dikes to surface water runoff.

An analysis of current and historical aerial photography of the site was conducted by the EPA Environmental Photographic Interpretation Center (EPIC). Photographs from 1952 through 1990 were included in the study. They confirm that the site was paved in 1975 when the Woodbury Chemical took over the site. According to the photos, the site boundary was expanded to include a portion of the adjacent farm field some time between 1979 and 1985.

6.0 SUMMARY OF SITE RISKS

A Baseline Risk Assessment was conducted by EPA as part of the RI to estimate the health or environmental problems that could result if the Woodbury Chemical site were not remediated. It is incorporated as Chapter 6 in the RI Report. A Baseline Risk Assessment represents an evaluation of the "No Action" alternative, in that it identifies the risk present if no remedial action is taken. The assessment considers environmental media and exposure pathways that could result in unacceptable levels of exposure now or in the foreseeable future. Data collected and analyzed during the RI provided the basis for the risk evaluation. The risk assessment process can be divided into four components: contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

6.1 CONTAMINANTS OF CONCERN

The objective of contaminant identification is to screen the information that is available on hazardous substances present at the site and to identify contaminants of concern in order to focus subsequent efforts in the risk assessment process. Contaminants of concern are selected based upon their toxicological properties, concentrations and frequency of occurrence at the site. During the Risk Assessment for the Woodbury Chemical site, the following chemicals were identified as contaminants of potential concern in the ground water: aldrin, chlordane, DDD,

DDT, dieldrin, heptachlor epoxide, chromium, arsenic, and nitrates. Although arsenic and nitrates were detected in control samples, they were retained as contaminants of drinking water standards. Contaminants of potential concern in the soil were identified as chlordane, DDD, DDE, DDT, dieldrin, and toxaphene.

Exposure point concentrations for the contaminants of concern were based on the reasonable maximum exposure (RME) or the maximum detected concentration, whichever was less.

6.2 EXPOSURE ASSESSMENT

An exposure assessment was conducted to estimate the magnitude of exposure to the contaminants of concern at the site and the pathways through which these exposures could occur. Exposure of workers to ground water was considered a possibility under the current scenario because onsite drinking water is obtained from private wells. However, there is currently no complete exposure pathway to the soil onsite because the site is paved. Estimating future potential risk at the site involved selecting the reasonably possible land use that resulted in the greatest level of risk, which in this case is the residential exposure scenario. This conservative approach is used so it is fairly certain that the actual risk will not exceed the risk associated with this scenario. Exposure of adults and infants to ground water as well as exposure of children to soil were assumed in the future residential scenario. It was assumed that the pavement would be removed if the site became residential. Current and future exposure pathways are listed in Table 6-1.

After exposure pathways were developed, the concentrations at the exposure points were calculated. These exposure point concentrations were based on the reasonable maximum exposure (RME) scenario - that is, the 95% upper confidence limit on the mean of the natural logarithm (ln) transformed data. The data are transformed because the data are assumed to be lognormal. In
some cases, the RME concentration exceeded the maximum concentration detected, so the latter was used instead. Exposure point concentrations for soil and ground water at the Woodbury Chemical Site are listed in Tables 6-2 through 6-4.

Once exposure point concentrations were developed, the chemical intake at each exposure point was calculated. Assumptions made in quantifying chemical intake are listed in Tables 6-5 and 6-6 for oral and dermal ground water exposure and in Tables 6-7 and 6-8 for oral and dermal soil exposure. These assumptions, along with the exposure point concentrations, are plugged into equations to give the Chronic Daily Intake (CDI) for each exposure pathway. The CDI's calculated in the Woodbury Chemical Risk Assessment are listed in Tables 6-9 through 6-13.

6.3 TOXICITY ASSESSMENT

The purpose of a toxicity assessment is to weigh available evidence regarding the potential of the contaminants of concern to cause adverse effects in exposed individuals and to provide an estimate of the relationship between the extent of exposure and the likelihood of adverse effects. The toxicity assessment is based on toxicity values which have been derived from quantitative dose-response information. Toxicity values for cancer are known as slope factors (SFs) and those determined for noncarcinogenic effects are referred to as reference doses (RfDs).

Slope factors (SFs), which are also known as cancer potency factors (CPFs), have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of (mg/kg-day)[-1], are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure

at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. SFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. SFs for the contaminants of concern at Woodbury Chemical are listed in Table 6-14.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g. the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have
been applied (e.g. to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. RfDs for the contaminants of concern at Woodbury Chemical are found in Table 6-15.

6.4 RISK CHARACTERIZATION

In this final step of the risk assessment, the results of the exposure and toxicity assessments are combined to provide numerical estimates of the carcinogenic and non-carcinogenic risks for the site. Excess lifetime cancer risks are determined by multiplying the intake level with the slope factor. These risks are probabilities that are generally expressed in scientific notation (e.g. 1x10[-6] or 1E-6). An excess lifetime cancer risk of 1x10[-6] indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer, over a 70-year lifetime, as a result of site-related exposure to a carcinogen. The NCP states that sites should be remediated to chemical concentrations that correspond to an upperbound lifetime cancer risk to an individual not exceeding 10[-6] to 10[-4] excess lifetime risk. Carcinogenic risk levels that exceed this range indicate the need for performing remedial action at a site.

Carcinogenic risk levels for each exposure scenario at the Woodbury Chemical site are listed in Tables 6-16 through 6-20. Current carcinogenic risks from exposure to ground water were calculated separately for workers onsite and those at hydrologically downgradient businesses. Risk for the onsite worker is 3.07E-5 and is 6.95E-5 for the worker at the downgradient business. Both of these risk values are within the risk range determined to be protective by EPA (10E-4 to 10E-6). Soil was not considered to be a current exposure pathway because the site is paved.

Future potential risk from exposure to contaminants at the site was calculated, based on the assumption that the site area would become residential in the future. Carcinogenic risk from future residential exposure to ground water at the site was calculated to be 5.93E-5, and future risk from residential exposure to soil would be 4.63E-6. These risks are within EPA's acceptable risk range.

Carcinogenic risk from exposure to arsenic was calculated separately because arsenic causes a different type of cancer than the other carcinogens. Section 6.5 of this document discusses why EPA allows higher risk from arsenic than from other contaminants. Furthermore, arsenic was found in the soil and ground water offsite, along the railroad right-of-way. The highest concentration was detected in an area that is not adjacent to the site. Information obtained by EPA indicates that the railroad sprayed arsenic-based herbicides along the right-of-way in the past. Risk from exposure to arsenic in ground water is 1.85E-3, which is above the acceptable risk range. However, arsenic does not appear to be site-related and may extend over a long stretch of the railroad right-of-way. Therefore, the arsenic contamination is beyond the scope

of this investigation. The railroad right -of-way has been referred to EPA's Site Assessment Section for further consideration.

To characterize potential noncarcinogenic effects, estimated intake levels are compared with toxicity values. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the Hazard Quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). A HQ exceeding unity (1.0) indicates a potential for site-related noncarcinogenic health effects. By adding the HQs for all contaminants within a medium or across all media to which a given population may be reasonably exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Noncarcinogenic risks for the exposure scenarios at the Woodbury Chemical Site are listed in Tables 6-21 through 6-26. Calculation of the noncarcinogenic risk from current worker exposure to ground water at the site resulted in a Hazard Index (HI) of 0.32. Future potential residential exposure calculations yielded a HI of 0.94, not including the contribution from arsenic. These are both below 1.0 which is the level which indicates a potential for site-related non-carcinogenic health effects. The HQ for exposure to arsenic inground water is 8.2 and will be dealt with separately, as stated above. The HI for future exposure to non-carcinogens in the soil is 0.039.

Nitrates (non-carcinogenic) and were detected in every ground water sample collected during the Woodbury Chemical RI. Their presence is most likely due to the heavy use of fertilizers in the area and is not due to activities at the site. A separate HQ was calculated for nitrates in the ground water because they cause adverse effects in infants at significantly lower doses than in adults. Therefore, exposure assumptions different from those for adults were used in the calculation. The HQ for future exposure of infants to ground water at the site is 2.21. Because the presence of nitrates in the ground water is an area-wide condition, EPA has reported analytical results for nitrates obtained during the Woodbury Chemical RI to state and local officials.

Table 6-27 summarizes the risks calculated for the Woodbury Chemical site. The results of the RI and Baseline Risk Assessment indicate that the 1990 removal of toxaphene-contaminated soils at the Woodbury Chemical site has reduced the risk from exposure to site-related contaminants to levels which are protective of human health and the environment.

6.5 DISCUSSION OF UNCERTAINTY

Omission of polynuclear aromatic hydrocarbons (PAHs) from the risk assessment could result in some underestimation of the risk. The PAH concentrations found along the railroad right-of-way adjacent to the Woodbury Chemical site were similar to those found along the railroad away from the site, indicating that these compounds are not attributable to the site.

The only chemical which exceeds the acceptable carcinogenic risk levels is arsenic in ground water. It was retained as a contaminant of concern in the risk assessment because the detected levels exceed the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act. However, arsenic was not included when calculating the overall site risk for the following reasons.

Since arsenic was not detected onsite and the highest level was detected in a control well, it appears that the presence of arsenic in the ground water is not a result of site activities. Furthermore, the carcinogenic effect on which the slope factor is based is a nonfatal form of skin cancer, whereas the other contaminants are of primary concern as liver carcinogens.

Some chemicals evaluated in assessment of the carcinogenic risk have not been assigned RfDs by which to calculate their noncarcinogenic effects. Therefore, the HI for the site may be underestimated. However, it is believed that a contaminant concentration that falls within EPA's cancer risk range will be protective against systemic toxic effects as well.

Use of the RME in calculating exposure point concentrations helps to assure that the true average for the site is not greater that the value used. Therefore, it is possible that the actual exposure point concentration is overestimated to some degree.

6.6 ECOLOGICAL ASSESSMENT

A qualitative ecological assessment was performed for the Woodbury Chemical site due to the developed nature of the site and the surrounding area. The terrestrial non-human receptors associated with the site are expected to be those commonly associated with industrial/ commercial/agricultural developed area. The site is fenced and paved, thereby limiting exposure to wildlife.

The C-102 Canal is the closest water body to the site. There has been one report of an occurrence of a manatee, an endangered species, in this stretch of the canal. The presence of the manatees is considered an infrequent incidence. There is no known or apparent current surface or ground water pathway to the canal due to the lack of a ground water contaminant plume. The possibility of an historical ground water pathway cannot be eliminated, however, due to the high ground water migration rates. Current ground water contaminant levels would not be expected to impact the C-102 Canal. Wells between the site and the canal have very low or nondetectable contaminant levels.

The ecological risks associated with this site appear to be minimal and at an acceptable level requiring no further action unless the planned ground water monitoring would demonstrate a future threat to the C-102 Canal.

7.0 DESCRIPTION OF THE "NO FURTHER ACTION" SELECTED ALTERNATIVE

EPA has determined, based on the results of the RI and Risk Assessment, that no further action is needed for the soil at the Woodbury Chemical Site. The removal of toxaphene-contaminated soil which was performed at the site in January 1990 sufficiently reduced the risk from exposure to site related contaminants in the soil to within EPA's protective range.

RI and Risk Assessment results also indicated that no action is necessary for the ground water at the Woodbury Chemical Site. However, because the future potential risk from exposure to the ground water at the site is close to the level at which EPA may consider taking action, the ground water at and around the site will be monitored quarterly for one year to confirm that the few samples collected during the RI which contained contaminants above drinking water standards are not indicative of a release of contaminants from the Woodbury Chemical Site. It is anticipated that at least two (2) permanent wells will have to be installed in areas where temporary wells were placed during the RI and an additional permanent monitoring well immediatelydowngradient of soil sample WC-011-SS. Quarterly monitoring will include all existing and newly installed EPA monitoring wells as well as a down gradient private well. The samples shall be analyzed for pesticides/PCBs. Based upon EPA's Cost of Remedial Action (CORA) model, the estimated cost of the monitoring is $22,500 (Table 7-1). If monitoring indicates a potential threat to human health or the environment, EPA, in consultation with the State of Florida, will reconsider the protectiveness of this alternative and the need for protective measures or site remediation.

8.0 DOCUMENTATION OF SIGNIFICANT DIFFERENCES

The selected remedy as presented in this decision document has no difference, significant or otherwise, from the proposed plan.